

IN THE DRAWINGS

The attached sheets of drawings include changes to Figs. 1 and 7. These sheets, which include Figs. 1 and 7, replace the original sheets including Fig. 1 and 7.

Attachment: Replacement Sheets

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-8, 10, 12, 13, and 15-25 are presently active. Claims 9, 11, 14, and 26-45 are withdrawn from consideration. Claims 1, 4, and 5 have been presently amended. Claims 46 and 47 have been presently added.

In the outstanding Office Action, Figures 1 and 7 were objected to; the disclosure was objected to due to informalities; Claim 4 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite; Claims 1-8 were rejected under 35 U.S.C. § 102(b) as being anticipated by Hong (U.S. Pat. No. 5,897,752); Claims 10, 13, 16-18, and 21, 23-25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hong in view of O'Donnell (U.S. Pat. Appl. Publ. No. 2005/0150866) and Fakuda (U.S. Pat. Appl. Publ. No. 2003/0113479); Claims 12, 19, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hong in view of O'Donnell, Fakuda and further in view of George (U.S. Pat. No. 4,357,387); Claims 15 and 22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hong in view of O'Donnell, Fakuda and further in view of Panitz (U.S. Pat. No. 5,925,228); and Claims 1, 5, 10, 12, 13, and 15-25 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 1, 3-5, 7, 9-14, and 16-18 of copending U.S. Serial No. 10/722,602 in view of Hong.

Regarding the objection to the specification and drawings

The specification and figures 1 and 7 have been amended to address the informalities identified in the Office Action. Thus, it is respectfully submitted the objection to the specification has been overcome.

Regarding the 35 U.S.C. § 112, second paragraph, rejection

The claims have been amended to address the 35 U.S.C. § 112, second paragraph, rejection. Support for the amendments and newly added claims is found in the specification from page 19, lines 7-10 and page 33, lines 13-15. These passages describe that the electrodes are embedded inside the ring member. Further, from page 19, lines 4-7 and page 28, lines 20-26, it is clear that the ring member is spaced apart from an outer periphery of the to-be-treated substrate. Newly added Claims 46 and 47 are supported by page 19, lines 2-7 and Figs. 1 and 8.

Thus, it is respectfully submitted that the 35 U.S.C. § 112, second paragraph, rejection has been overcome without introducing new matter.

Regarding the 35 U.S.C. 102(b) rejection

The rejection of Claims 1-8 under 35 U.S.C. § 102(b) as being unpatentable over Hong is most respectfully traversed in view of the present amendments to Claims 1 and 5.

By way of review, the present invention, as defined in the independent Claim 1, is directed to a plasma processing apparatus for performing a processing on a to-be-treated substrate mounted on a mounting table in a processing vessel by plasma of a processing gas, including a ring member formed of an insulating material, installed to surround the to-be-treated substrate on the mounting table and spaced apart from an outer periphery of the to-be-treated substrate, one or more electrodes embedded inside the ring member formed of the insulating material, and a DC power supply for applying a DC voltage to the one or more electrodes to adjust a plasma sheath region above the ring member.

Further, the present invention, as defined in the independent Claim 5, is directed to a ring member formed of an insulating material, installed to surround the to-be-treated substrate on the mounting table and spaced apart from an outer periphery of the to-be-treated

substrate, wherein the ring member includes one or more electrodes, embedded inside the ring member formed of the insulating material, to each of which a DC voltage is applied to adjust a plasma sheath region above the ring member. The ring member promotes the sharing of an apparatus by applying a variable DC voltage to each electrode in the ring member formed of the insulator.

Hong relates to a bias ring in a self-sustained sputtering plasma reactor. The bias ring in Hong is electrically biased to control the plasma potential and hence to control the energy and directionality of the ions being sputter deposited on the wafer. Specifically, Hong discloses a clamp ring 46 in Fig. 3 to have a metallic body 48 on its side facing the plasma and an insulating film 50 on its side touching the wafer 16 and pedestal 18. The DC power supply is connected to the metallic body 48 through an electrical line 52, and thereby, the clamp ring 46 can be biased independently of the wafer 16.

However, the metallic body 48 of Hong is disposed on top of the insulating film 50 and exposed to the plasma, and the clamp ring 46 has direct contact with the wafer to support the wafer mechanically. Therefore, the clamp ring 46 in Hong differs from the ring member of the present invention in the fact that (1) the electrodes of the present invention are not exposed to the plasma since the electrodes are embedded inside the ring member formed of the insulating material, and (2) the ring member of the present invention is spaced apart from the outer periphery of the substrate. Hong does not disclose the ring member of the present invention and cannot achieve the effectiveness of the present invention described above.

Consequently, it is most respectfully requested that the rejection of Claims 1 and 5 under 35 U.S.C. § 102(b) be withdrawn. It is also believed that Claims 2-8 directly or indirectly depending on Claims 1 and 5 are allowable for the same reasons indicated with respect to Claims 1 and 5, and further because of the additional features recited therein which, when taken alone and/or in combination with the features recited in Claims 1 and 5,

remove the invention defined therein further from the disclosures made in the cited references.

Regarding the 35 U.S.C. 103(a) rejection

The rejection of Claims 10, 12-13, and 15-25 under 35 U.S.C. § 103(a) is also respectfully traversed for similar reasons as above.

Applicants wish to direct the Examiner's attention to basic requirement of a prima facie case of obviousness as set forth in the M.P.E.P. § 2143 in which the prior art references (or references when combined) must teach or suggest all the claim limitations. More specifically, M.P.E.P. § 2143.03 states that all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is non-obvious under 35 U.S.C. 103, then any claim depending therefrom is non-obvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1998).

Independent Claim 5 is directed to a ring member formed of an insulating material, installed to surround the to-be-treated substrate on the mounting table and spaced apart from an outer periphery of the to-be-treated substrate, wherein the ring member includes one or more electrodes, embedded inside the ring member formed of the insulating material, to each of which a DC voltage is applied to adjust a plasma sheath region above the ring member. The ring member promotes the sharing of an apparatus by applying a variable DC voltage to each electrode in the ring member formed of the insulator.

As noted earlier, Hong discloses a clamp ring 46 in Fig. 3 to have a metallic body 48 on its side facing the plasma and an insulating film 50 on its side touching the wafer 16 and pedestal 18. The DC power supply is connected to the metallic body 48 through an electrical

line 52, and thereby, the clamp ring 46 can be biased independently of the wafer 16. The metallic body 48 of Hong is disposed on top of the insulating film 50 and exposed to the plasma, and the clamp ring 46 has direct contact with the wafer to support the wafer mechanically.

Therefore, the clamp ring 46 in Hong differs from the ring member of the present invention in the fact that (1) the electrodes of the present invention are not exposed to the plasma since the electrodes are embedded inside the ring member formed of the insulating material, and (2) the ring member of the present invention is spaced apart from the outer periphery of the substrate. Hong does not disclose or suggest the ring member of the present invention and cannot achieve the effectiveness of the present invention described above.

Furthermore, the deficiencies of Hong are not overcome by O'Donnell or Fakuda. The outstanding Office Action notes that O'Donnell discloses a focus ring 14. However, focus ring 14 is not spaced apart from an outer periphery of the to-be-treated substrate and does not include an electrode, focus ring 14 is not connected to a power supply. The outstanding Office Action relies on Fakuda for its teaching of a sealing treatment. Fakuda does not disclose a focus ring element. The outstanding Office Action relies on George for its teaching of a sealing a thermally sprayed refractory. George also does not disclose a focus ring element. The outstanding Office Action relies on Panitz for its teaching of a sol gel treatment. Panitz also does not disclose a focus ring element.

Accordingly, the present invention according to the independent Claim 5 is non-obvious in view of any combination of the applied prior arts. Consequently, it is most respectfully requested that the rejection of Claims 10, 12-13, and 15-25 directly or indirectly depending on Claim 5 be withdrawn for the same reasons indicated with respect to Claim 5, and further because of the additional features recited therein which, when taken alone and/or

in combination with the features recited in Claim 5, remove the invention defined therein further from the disclosures made in the cited references.

Regarding the Double Patenting Rejection

As stated in the above regarding the rejection under 35 U.S.C. 103(a), Hong does not disclose or suggest the ring member of the present invention and cannot achieve the effectiveness of the present invention. Therefore, it is most respectfully requested that the double patenting rejection be withdrawn.

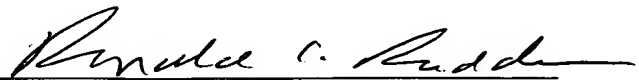
Conclusion

The present response is believed to be a full and complete response to the outstanding Office Action. Should there be any remaining issues before allowance, the examiner is invited to contact the undersigned to discuss these issues.

Consequently, in view of the present amendment and in light of the above discussions, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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